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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/669,111	09/23/2003	Shanjen Pan	TI-36040	3098
23494	7590	12/13/2004	EXAMINER	
TEXAS INSTRUMENTS INCORPORATED			POMPEY, RON EVERETT	
P O BOX 655474, M/S 3999			ART UNIT	
DALLAS, TX 75265			PAPER NUMBER	
			2812	

DATE MAILED: 12/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/669,111

Applicant(s)

PAN ET AL.

Examiner

Ron E Pompey

Art Unit

2812

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) 19-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 4, 5, 7, 9, 10, 13-16, and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Beasom (US 5,650,658).

Beasom discloses the limitations of:

forming a first well (31, fig. 6) of a first conductivity type in a substrate;

forming a second well (111, fig. 9) of a second conductivity type in the substrate, the first and second conductivity types being opposite, wherein portions of the first and second wells overlap in a compensated channel region (113, fig. 9) of the substrate (col. 9, lns. 18-36);

forming a drain (33, fig. 9) of the first conductivity type in a portion of the first well;

forming a source (34, fig. 9) of the first conductivity type in a portion of the second well;

forming a thick dielectric (61, fig. 9) extending laterally from a first end adjacent the drain to a second opposite end in the first well, the thick dielectric extending into the first well of the substrate;

forming a thin (63, fig. 3) dielectric over the substrate, the thin dielectric extending from the second end of the thick dielectric in the first well to the source in the

Art Unit: 2812

second well, a portion of the thin dielectric extending over the compensated channel region of the substrate;

forming a conductive gate (41, fig. 3) contact structure extending over the thin dielectric and over a portion of the thick dielectric (col. 8, lns. 1-9);

further comprising providing dopants of the second conductivity type in an adjust region of the first well in the substrate proximate the second end of the thick dielectric (105, fig. 8);

wherein providing dopants of the second conductivity type in the adjust region comprises implanting dopants of the second conductivity type in the adjust region;

wherein implanting dopants of the second conductivity type in the adjust region comprises performing a V_t adjust implant using a V_t adjust mask that exposes the adjust region of the substrate (col. 9, lns. 1-8); (examiner's note: reducing the on-resistance reducing profile is adjusting the V_t , because the V_t determines what it takes to turn on the device or in other words the level of resistance of the device to turn on.)

wherein forming the thick dielectric comprises performing a LOCOS process;

wherein the first conductivity type is n-type and the second conductivity type is p-type (col.3, lns. 3-11) (examiner's note: CMOS inherently implies both NMOS and PMOS devices are being formed, therefore either device will be formed in similar fashion); and

wherein forming the first well comprises implanting dopants of the first conductivity type into a portion of the substrate using a first well mask (93, fig. 6) exposing the compensated channel region, and wherein forming the second well

Art Unit: 2812

comprises implanting dopants of the second conductivity type into a portion of the substrate using a second mask (col. 9, Ins. 19-22) exposing the compensated channel region.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 3, 6, 8, 11-12 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beasom (US 5,650,658) in further view of Kotecha et al. (US 4,329,186).

Beasom does not disclose the claimed limitation(s) of:

wherein the first well has a concentration of dopants of the first conductivity type, less than or equal to a first concentration value proximate the second end of the thick dielectric, and wherein the adjust region has a concentration of dopants of the second conductivity type at a second concentration value in the adjust region, the second concentration value being less than the first concentration value;

wherein implanting dopants of the second conductivity type in the adjust region is done after forming the thick dielectric;

wherein forming the thick dielectric comprises performing an STI process

wherein dopants of the first conductivity type are implanted using the first mask at a first implantation dose, wherein dopants of the second conductivity type are

Art Unit: 2812

implanted using the second mask at a second implantation dose, and wherein the first dose is greater than or equal to the second dose.

However,

a. Kotecha discloses the above claimed limitations regarding:

Implanting dopants of a second conductivity in the adjust region (68 or 70, fig. 6) is done after forming the thick dielectric (26, fig. 7) in column(s) 7, line(s) 10-26.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Kotecha with Beasom, because implanting after forming the thick dielectric provides for better accuracy in only the adjust region. Additionally applicant provides no criticality, only as a possible alternatives, for when, either before or after forming the thick dielectric, to implant dopants into the adjust region, therefore selection of any order of performing process steps is *prima facie* obvious in the absence of new or unexpected results (In re Burhans, 154 F.2d 690, 69 USPQ 330 (CCPA 1946)).

b. Beasom disclose the general conditions of the limitations wherein:

the second concentration, of the dopants in the adjust region, value being less than the first concentration, of the first well, value; wherein the first dose, of first conductivity dopants in the first well mask, is greater than or equal to the second dose, of second conductivity dopants in the second well mask, but fail to disclose the exact concentrations of the first and second concentrations or doses. However, the court has said where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.

Art Unit: 2812

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to adjusting dopant concentrations to whatever level is known in the art and if the dopants in the well are at a higher concentration than the adjust region the device can handle more voltage due to the large number of carriers.

For the limitation wherein the thick dielectric is a STI process instead of a LOCOS, it has been found by the court that the substitution of one known equivalent technique for another may be obvious even if the prior art does not expressly suggest the substitution. One of ordinary skill in the art at the time of the invention knows that STI and LOCOS are both processes to make isolation regions, therefore without a suggestion of the criticality of using one over the other this limitation alone does not make the claims no obvious.

Election/Restrictions


2. Applicant's election without traverse of claims 1-18 in the reply filed on September 14, 2004 is acknowledged.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ron E Pompey whose telephone number is (571) 272-1680.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on (571) 272-1679. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2812

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Ron Pompey
AU: 2812
December 9, 2004


John F. Niebling
Supervisory Patent Examiner
Technology Center 2800